THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 21

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte THOMAS W. SMITH and DAVID J. LUCA

Appeal No. 1997-3376
Application No. 08/176,187

ON BRIEF

Before KIMLIN, JOHN D. SMITH, and DELMENDO, Administrative Patent Judges.
DELMENDO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1 through 5, 7 through 14, 16 through 19, and 25, which are all of the claims pending in this application. Claim 1 is representative and is reproduced below:

1. A composition comprised of a composite comprised of an aromatic or heteroaromatic polymer comprised of monomer or monomers selected from the group consisting of pyrrole, indole, thiophene, thianaphthene, indene, azulene and ring pendant substituent derivatives thereof as a discrete phase; and a block copolymer as a continuous phase selected from the group consisting of ionophoric and ionomeric copolymers, wherein the

block copolymer has at least one apolar segment and at least one ion binding segment, wherein the ionomeric or ionophoric block copolymer is present in an amount from about 99 to about 50 percent by weight based on the combined weight of the block copolymer and the aromatic or heteroaromatic polymer, wherein said block copolymer provides micellar or vesicular domains for organization and polymerization of said monomer or monomers and wherein the bulk or surface electrical conductivity of the composite is homogeneous and isotropic.

The examiner relies upon the following references as evidence of obviousness:

Naarmann et al. (Naarmann)	4,665,129	May 12, 1987
Armes et al. (Armes '162)	4,959,162	Sep. 25, 1990
Armes et al. (Armes '180)	4,959,180	Sep. 25, 1990[1]
Armes et al. (Armes '193)	5,021,193	Jun. 4, 1991
Cross et al. (Cross) (published UK patent application)	2,124,635 A	Feb. 22, 1984
Vincent et al. (Vincent) (published PCT application)	WO 90/02763	Mar. 22, 1990

Bates et al., "Flexible and Heat-processable Conductive Films of Polypyrrole," ***J. Chem. Soc., Chem. Commun.***, pp. 871-72 (1985) (Bates).

Appellants' claimed invention is directed to a composition comprised of a composite comprised of a particular aromatic or heteroaromatic polymer as a discrete phase and a particular ionomeric or ionophoric block copolymer having at least one

[1] Armes '180 is not listed under "Prior Art of Record" on page 3 of the examiner's answer. However, the omission appears to have been inadvertent, because the statement of rejection (answer, page 3) positively refers to this reference.

apolar segment and at least one ion binding segment as a continuous phase, wherein the block copolymer is present in an amount of from about 50 to about 99 percent by weight (based on the combined weight of the block copolymer and the aromatic or heteroaromatic polymer) and provides micellar or vesicular domains for organization and polymerization of the monomer or monomers making up the aromatic or heteroaromatic polymer, and wherein the bulk or surface electrical conductivity of the composite is homogeneous and isotropic. According to appellants, the block copolymers "enable formation of conductive composites with discrete uniformly dispersed domains of the conductive polymer therein and thereby afford the desired stability, conductivity, an [sic, and] melt processibility of the composite" (principal brief, page 4).

Appealed claims 1-5, 7-14, 16-19, and 25 stand rejected under 35 U.S.C. § 103 as unpatentable over the combined teachings of Bates and Naarmann or the combined teachings of Bates, Naarmann, Cross, Vincent, Armes '162, Armes '180, and Armes '193.[2]

[2] The statement of rejection (answer, page 3) does not positively include Armes '162 as one of the relied upon references. However, this omission also appears to have been inadvertent, because Armes '162 is listed under "Prior Art of Record" (answer, page 3) and was applied in the final rejection (final Office action, pages 2-3).

Upon careful consideration of the entire record, including all of the opposing arguments presented on appeal, it is our judgment that the prior art references applied by the examiner fail to establish a ***prima facie*** case of obviousness against the claimed subject matter. Accordingly, we will not sustain the examiner's rejection.

Bates discloses flexible and heat-processable conductive films of polypyrrole, as follows:

> In this communication, we report the formation of elastic and melt-processable conductive films of polypyrrole by another route, in which the doping behaviour of this class of polymers is exploited. Polypyrrole and related electro-oxidatively formed conductive polymers such as polythiophene, polyaniline, and polyazulene are obtained directly in stable doped forms in which the dopant is an anionic species derived from the electrolyte. Our approach was to employ as dopants anionically derivatised polymers. Improved mechanical properties derive from the chain structure of the dopant. This approach differs from those mentioned above because **the strengthening member is an intrinsic part of the conducting polymer matrix** (third paragraph, left column, page 871) (footnotes omitted; emphasis added).

Bates conducts polymerization of pyrrole by performing electrolysis in a 2-electrode single compartment electrolytic cell equipped for vigorous stirring, and the resulting polymer film is peeled from the electrode (fourth paragraph, left column, page 871). In sample 6 of Table 1 (page 872), Bates describes the polymerization of pyrrole in the presence of 4.8 percent by

weight of a sulfonated styrene/hydrogenated butadiene tri-block copolymer dopant and THF-$PhNO_2$ solvent. The examiner considers the tri-block copolymer of sample 6 to be within the scope of appellants' "ionophoric and ionomeric copolymers" as specified in appealed claim 1. As pointed out by the examiner (answer, page 5), Bates discloses that the film can be "heat processed to a homogeneous structure without loss of conductivity or of mechanical properties" (third full paragraph, right column, page 871).

In contrast to the subject matter of appealed claim 1, Bates differs as follows: (1) the polypyrrole and the tri-block copolymer do not constitute the discrete and continuous phases of the conductive film, respectively; (2) the tri-block copolymer is not present in an amount from about 50 percent by weight to about 99 percent by weight; and (3) the tri-block copolymer does not appear to provide micellar or vesicular domains for organization and polymerization of the monomer or monomers. In addition, it is not clear from this record whether the bulk or surface electrical conductivity of Bates's film is isotropic.

With respect to the first difference, the examiner dismisses the claimed limitations regarding the polypyrrole discrete phase (and the ionomeric or ionophoric block copolymer continuous phase) as mere process limitations that do not affect the final

product (supplemental answer, page 3). We do not agree, because this is a material limitation that further defines the structure of the final product. In the present case, the examiner has not proffered any evidence or sound technical reasoning as to why the presently claimed discrete and continuous phases would inherently form simply by increasing the amount of the tri-block copolymer in Bates.[3] Contrary to the examiner's stated position, Bates teaches exactly the opposite. Specifically, Bates states that the strengthening member (i.e., the dopant polymer) is an "intrinsic part of the conducting polymer matrix" (last sentence, third paragraph, left column, page 871). Therefore, Bates does not contemplate the conducting polymer to be a discrete phase within a continuous matrix of the tri-block copolymer. Nor is there any motivation, suggestion or teaching in the prior art that would have led one of ordinary skill in the art to modify Bates to form a polypyrrole discrete phase within a continuous matrix of dopant polymer.

Regarding the amount of the tri-block copolymer, we do not find any teaching in Bates, or any other applied reference, to modify sample 6 by using significantly higher amounts (e.g.,

[3] ***Continental Can Co. v. Monsanto Co.***, 948 F.2d 1264, 1269, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991); ***In re Oelrich***, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981); ***Ex parte Levy***, 17 USPQ 1461, 1464 (Bd. Pat. App. & Inter. 1990).

about 50 percent by weight) of the tri-block copolymer. In the answer, the examiner explains that "if it is a tougher and more flexible composition that is desired, then the ratio of the thermoplastic tri-block copolymer [to the polypyrrole] can be increased, but overall conductivity will have to be sacrificed" (answer, page 6). However, the examiner also states:

> What is truly amazing about this particular dopant polymer is that it can impart its desirable properties to the composition when only a small amount is used (see Table 1, p. 872) where only 4.8 wt% (relative to 95.2 wt% polypyrrole) will still impart flexibility to the composition even without solvent. (Answer, pages 5-6.)

In view of the examiner's finding that just a small amount of tri-block copolymer imparts desirable properties, we see no reason why one of ordinary skill in the art would have increased the amount of the dopant polymer from 4.8 percent by weight to about 50 percent by weight at the expense of lowering conductivity.

Further, appellants' claims call for an ionomeric or ionophoric block copolymer that "provides micellar or vesicular domains for organization and polymerization of said monomer or monomers" to control the morphology of the final composite. According to appellants' specification, this is accomplished by complexing or sequestering redox active dipolar molecules or ions, which act as the oxidative coupling or redox reagent for

the polymerization of the aromatic or heteroaromatic monomer or monomers, with the ion binding segment of the ionomeric or ionophoric block copolymer (specification, pages 1, 2, 10, and 14-17). The examiner is correct in asserting that it is the final product of Bates that must be compared against the claimed invention, and not the particular production processes involved.[4] But here, the examiner has not adduced any evidence or scientific reasoning that would indicate that the film of Bates would inherently possess the same morphology as the appellants' claimed composition.

The examiner also relies on the teachings of Naarmann. However, we agree with appellants that Naarmann does not remedy the deficiencies of Bates. Naarmann describes thermoplastic mixtures which are based on macromolecular compounds and polypyrrole, wherein the polypyrrole is embedded in a matrix of the macromolecular compound (column 1, lines 7-11). Suitable macromolecular compounds include polyolefins, styrene polymers such as polystyrene or copolymers of styrene with acrylonitrile or maleic anhydride, chlorine containing polymers, (meth)acrylate polymers, water-soluble polymers such as polyvinyl pyrrolidone or polyvinyl alcohol, polycondensates, and naturally occurring

[4] ***See***, e.g., ***In re Thorpe***, 777 F.2d 695, 697, 227 USPQ 964, 966 (Fed. Cir. 1985).

macromolecular compounds (column 1, line 60 column 2, line 13). Although Naarmann discloses that the amount of the macromolecular compound can be from 10 to 90 weight percent (column 2, line 66 to column 3, line 2), Naarmann does not specifically describe the ionomeric or ionophoric block copolymer containing an ion binding segment as in the present invention or Bates. Additionally, Naarmann teaches solution or suspension polymerization, followed by precipitation, filtration, and washing (column 3, line 61 to column 4, line 2; Examples 1-14). Naarmann's polymerization technique is quite different from the electro-oxidative polymerization disclosed in Bates, where polypyrrole film that is deposited onto an electrode as pyrrole is polymerized. Under these circumstances, we determine that one of ordinary skill in the art would have found no motivation, suggestion or teaching from Naarmann to increase the amount of tri-block copolymer in Bates. ***In re Dembiczak***, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999); ***In re Fine***, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988).

Cross discloses the use of dopant polymers to influence the chemical and/or physical properties of the conductive polymer (page 1, line 62-81; pages 2, lines 9-31; page 2, lines 64-102). Although Cross teaches the use of relatively high amounts of the dopant polymer (e.g., 5 grams of the dopant polymer per 0.06 mole

of pyrrole being used in Example 4), this reference fails to disclose or suggest the ionomeric or ionophoric block copolymer having an ion binding segment as in appellants' claimed invention. Also, like Bates, Cross does not provide any factual or scientific basis to presume that the polypyrrole would possess the same polymer structure as recited in claim 1 on appeal.

Turning to Vincent, this reference discloses a method of preparing "bare" dispersions of electrically conducting polymers that do not contain significant quantities of water soluble sterically stabilizing polymers (page 5, lines 21-28). We do not find anything in this reference that would have motivated one of ordinary skill in the art to modify any of the products of the aforementioned references to arrive at appellants' claimed invention.

As for the three Armes patents, these references all describe the polymerization of aromatic nitrogen-containing monomers in the presence of a stabilizer and dopant anions (column 1, lines 34-50 of Armes '162; column 1, lines 44-62 of Armes '180; column 1, lines 47-60 of Armes '193). However, the examiner has not explained why the teachings of these references would have motivated one of ordinary skill in the art to make the proposed modification of Bates.

For these reasons, we determine that the subject matter of appealed claim 1 would not have been obvious to one of ordinary skill in the art within the meaning of 35 U.S.C. § 103. Since the remaining claims on appeal all depend from claim 1, one of ordinary skill in the art would not have found the subject matter defined by each of these dependent claims to have been obvious over the applied references. Accordingly, the examiner's rejection is reversed.

New Ground of Rejection

We enter the following new ground of rejection pursuant to 37 CFR 1.196(b):

Claims 1-5, 7-14, 16-19, and 25 are rejected under the first paragraph of 35 U.S.C. § 112 as failing to comply with the written description requirement of this statutory provision.

Claim 1 defines a composition comprised of a composite having, ***inter alia***, a bulk or surface electrical conductivity which is "homogeneous and isotropic." For the reasons set forth below, we find that amended claim 1 violates the written description requirement of the first paragraph of 35 U.S.C. § 112.

The first paragraph of 35 U.S.C. § 112 reads as follows:

> **The specification shall contain a written description of the invention and of the manner and**

> process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention. (Emphasis added.)

In order for a claim to satisfy the written description requirement, the original application must reasonably convey to those skilled in the relevant art that applicant, as of the filing date of the original application, had possession of the claimed invention. ***In re Alton***, 76 F.3d 1168, 1172, 37 USPQ2d 1578, 1581 (Fed. Cir. 1996); ***In re Kaslow***, 707 F.2d 1366, 1375, 217 USPQ 1089, 1096 (Fed. Cir. 1983)). In general, it has been held that although the applicant "does not have to describe exactly the subject matter claimed,...the description must clearly allow persons of ordinary skill in the art to recognize that [applicant] invented what is claimed." ***In re Gosteli***, 872 F.2d 1008, 1012, 10 USPQ2d 1614, 1618 (Fed. Cir. 1989)(citations omitted).

With these legal tenets in mind, we consider the facts of the present case. During prosecution, appellants amended claim 1 by introducing the claim limitation with respect to the bulk or surface electrical conductivity being "homogeneous and isotropic" (paper no. 11, amendment filed February 2, 1996). Contrary to current patent practice, appellants' representative did not point

out how the application, as originally filed, provides adequate descriptive support for the amendment being made. In the amendment filed September 23, 1994, appellants stated: "The composite compositions of the present invention are **believed** to possess **nearly** uniform bulk or homogeneous conductivity properties..." (page 4; emphases added). Other than appellants' "belief" and unsupported allegations, we are unable to find any description in the original application that would reasonably convey to one skilled in the art that appellants had possession of the subject matter of amended claim 1. Indeed, appellants' specification repeatedly states that the conductive polymer forms a "discrete" phase within a continuous phase of the block copolymer in the composite. Therefore, it is unlikely that the composite would possess a homogeneous, let alone an isotropic, surface conductivity, especially when only about 50 percent by weight of the conductive polymer is present.

Because the application, as originally filed, does not reasonably convey to one skilled in the art a composition with a "homogeneous and isotropic" surface conductivity, claim 1 and all other appealed claims violate the written description requirement of 35 U.S.C. § 112, first paragraph.

Other Issue(s)

The present application does not contain an abstract of the disclosure, as required by 37 CFR § 1.72(b). We trust that the examiner and appellants will attend to this matter prior to an allowance of this application.

Time for taking action

This decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b). 37 CFR § 1.196(b) provides that "[a] new ground of rejection shall not be considered final for the purposes of judicial review."

37 CFR § 1.196(b) also provides that the appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (37 CFR § 1.197(c)) as to the rejected claims:

> (1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .
>
> (2) Request that the application be reheard under 37 CFR § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR

§ 1.136(a).

REVERSED
37 CFR § 1.196(b)

EDWARD C. KIMLIN Administrative Patent Judge	)
JOHN D. SMITH Administrative Patent Judge	) BOARD OF PATENT APPEALS AND INTERFERENCES
ROMULO H. DELMENDO Administrative Patent Judge	)

RHD/kis
RONALD ZIBELLI
XEROX CORPORATION
XEROX SQUARE 020

ROCHESTER, NY 14644